



TABLE 2

CRY3Bb* PROTEINS EXHIBITING IMPROVED ACTIVITY AGAINST SCRW LARVAE

CRY3Bb* Protein Designation	<i>cry3Bb</i> * Plasmid Designation	<i>cry3Bb</i> * Nucleotide Sequence Changes	CRY3Bb* Amino Acid Changes	Structural Site of Changes	Fold Increase Over WT Activity	Design Method Used
CRY3Bb.60	—	—	ΔI-159	Δα1-α3	3.6×	1, 6, 8
CRY3Bb.11221	PEG1707	A460T, C461T, A462T, C464A, T465C, T466C, T467A, A468T, A469T, G470C, T472C, T473G, G474T, A477T, A478T, G479C	T154F, P155H, L156H, L158R	1α3, 4	6.4×	1, 8
CRY3Bb.11222	PEG1708	T687C, T688C, A689T, C691A, A692G	Y230L, H231S	α6	4.0×	3, 7
CRY3Bb.11223	PEG1709	T667C, T687C, T688A, A689G, C691A, A692G	S223P, Y230S	α6	2.8×	3
CRY3Bb.11224	PEG1710	T687C, A692G	H231R	α6	5.0×	7, 8
CRY3Bb.11225	PEG1711	T687C, C691A	H231N, T241S	α6	3.6×	7
CRY3Bb.11226	PEG1712	T687C, C691A, A692C, T693C	H231T	α6	3.0×	7, 8
CRY3Bb.11227	PEG1713	C868A, G869A, G870T	R290N	1α7, β1	1.9×	2, 3, 4, 6
CRY3Bb.11228	PEG1714	C932T, A938C, T942G, G949A, T954C	S311L, N313T, E317K	1β1, α8	4.1×	2, 4

Cry3Bb *	<i>cry3Bb</i> *	<i>cry3Bb</i> * Nucleotide Sequence	Cry3Bb * Amino Acid Changes	Structural Site of Changes	Fold Increase Over WT Activity	Design Method Used
Protein	Plasmid	Changes				
Designation	Designation					
Cry3Bb.11229	PEG1715	T931A, A933C, T942A, T945A, G949A, A953G, T954C	S311T, E317K, Y318C	1β1, α8	2.5×	2, 4
Cry3Bb.11230	PEG1716	T931G, A933C, C934G, T945G, C946T, A947G, G951A, T954C	S311A, L312V, Q316W	1β1, α8	4.7×	2, 4 8
Cry3Bb.11231	PEG1717	T687C, A692G, C932T, A938C, T942G, G949A, T954C	H231R, S311L, N313T, E317K	α6; 1β1, α8	7.9×	2, 4, 7, 8, 10
Cry3Bb.11232	PEG1718	T931A, A933G, T935C, T936A, A938C, T939C, T942C, T945A, G951T, T954C	S311T, L312P, N313T, E317N	1β1, α8	5.1×	4
Cry3Bb.11233	PEG1719	T931G, A933C, T936G, T942C, C943T, T945A, C946G, G948C, T954C	S311A, Q316D	1β1, α8	2.2×	2, 4
Cry3Bb.11234	PEG1720	T861C, T866C, C868A, T871C, T872G, A875T, T877A, C878G, A882G	I289T, L291R, Y292F, S293R	1α7, β1	4.1×	4
Cry3Bb.11235	PEG1721	T687C, A692G, C932T	H231R, S311L	α6; 1β1, α8	3.2×	2, 4, 7, 8, 10

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Protein	Plasmid	Changes				
Designation	Designation					
Cry3Bb.11236	PEG1722	T931A, C932T, A933C, T936C, T942G, T945A, T954C	S311I	Iβ1, α8	3.1×	2, 4
Cry3Bb.11237	PEG1723	T931A, C932T, A933C, T936C, A937G, A938T, C941A, T942C, T945A, C946A, A947T, A950T, T954C	S311I, N313H	Iβ1, α8	5.4×	2, 4
Cry3Bb.11238	PEG1724	A933C, T936C, A937G, A938T, C941A, T942C, T945A, C946A, A947T, A950T, T954C	N313V, T314N, Q316M, E317V	Iβ1, α8	2.6×	2, 4
Cry3Bb.11239	PEG1725	A933T, A938G, T939G, T942A, T944C, T945A, A947T, G948T, A950C, T954C	N313R, L315P, Q316L, E317A	Iβ1, α8	2.8×	2, 4
Cry3Bb.11241	PEG1726	A860T, T861C, G862A, C868T, G869T, T871C, A873T, T877A, C878G, A879T	Y287F, D288N, R290L	Iα7, β1	2.6×	2, 3, 4, 6
Cry3Bb.11242	PEG1727	C868G, G869T	R290V	Iα7, β1	2.5×	2, 3, 4, 6, 8

Cry3Bb*	<i>cry3Bb*</i>	<i>cry3Bb*</i> Nucleotide Sequence	Cry3Bb* Amino Acid Changes	Structural Site of Changes	Fold Increase Over WT Activity	Design Method Used
Protein	Plasmid	Changes				
Designation	Designation					
Cry3Bb.11032	PEG1041	A494G	D165G	$\alpha 4$	3.1×	2, 4, 8
Cry3Bb.11035	PEG1046	G479A, A481C, A482C, A484C, G485A, A486C, A494G	S160N, K161P, P _R 162H, D165G	$\alpha 4$	2.7×	8
Cry3Bb.11036	PEG1047	A865G, T877C	I289V, S293P	$\text{I}\alpha 7, \beta 1$	4.3×	4
Cry3Bb.11046	PEG1052	G479A, A481C, A482C, A484C, G485A, A486C, A494G, A865G, T877C	S160N, K161P, P _R 162H, D165G, I289V, S293P	$\alpha 4; \text{I}\alpha 7, \beta 1$	2.6×	2, 4, 8, 10
Cry3Bb.11048	PEG1054	T309A, $\Delta 310$, $\Delta 311$, $\Delta 312$	D103E, $\Delta \text{A}104$	$\text{I}\alpha 2\alpha, 2\text{b}$	4.3×	8
Cry3Bb.11051	PEG1057	A565G, A566G	K189G	$\text{I}\alpha 4, 5$	3.0×	2, 3, 4
Cry3Bb.11057	PEG1062	T309A, $\Delta 310$, $\Delta 311$, $\Delta 312$, G479A, A481C, A482C, A484C, G485A, A486C, A494G	D103E, $\Delta \text{A}104$, S160N, K161P, P _R 162H, D165G	$\text{I}\alpha 2\alpha, 2\text{b}; \alpha 4$	3.4×	2, 4, 8, 10
Cry3Bb.11058	PEG1063	T309A, $\Delta 310$, $\Delta 311$, $\Delta 312$, A460T, C461T, A462T, C464A, T465C, T466C, T467A, A468T, A469T, G470C, T472C, T473G, G474T, A477T, A478T, G479C	D103E, $\Delta \text{A}104$, T154F, P155H, L156H, L158R	$\text{I}\alpha 2\alpha, 2\text{b}; \text{I}\alpha 3, 4$	3.5×	1, 8, 10

Cry3Bb* Protein	<i>cry3Bb</i> * Plasmid	<i>cry3Bb</i> * Nucleotide Sequence	Cry3Bb* Amino Acid Changes	Structural Site of Changes	Fold Increase Over WT Activity	Design Method Used
Designation	Designation					
Cry3Bb.11081	PEG1084	A494G, T931A, A933C, T942A, T945A, G949A, T954C	D165G, S311T, E317K	α 4; 1 β 1, α 8	6.1×	2, 4, 8, 10
Cry3Bb.11082	PEG1085	A494G, A865G, T877C, T914C, T931G, A933C, C934G, T945G, C946T, A947G, G951A, T954C, A1043G, T1094C	D165G, I289V, S293P, F305S, S311A, L312V, Q316W, Q348R, V365A	α 4; 1 α 7, β 1; β 1; 1 β 1, α 8; β 2; β 3b	4.9×	2, 4, 5, 8, 9, 10
Cry3Bb.11083	PEG1086	A865G, T877C, A1043G	I289V, S293P, Q348R	1 α 7, β 1; β 2	7.4×	4, 5, 9, 10
Cry3Bb.11084	PEG1087	A494G, C932T	D165G, S311L	α 4; 1 β 1, α 8	7.2×	2, 4, 8, 10
Cry3Bb.11095	PEG1095	A1043G	Q348R	β 2	4.6×	5, 9
Cry3Bb.11098	PEG1098	A494G, T687C, A692G, C932T, A938C, T942G, G949A, T954C	D165G, H231R, S311L, N313T, E317K	α 4; α 6, 1 β 1, α 8	7.9×	2, 4, 7, 8